

# *Mckenziartia* and *Pectocythere* (Pectocytheridae, Ostracoda, Crustacea) in Lake Macquarie, New South Wales

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The distribution pattern of four species of *Mckenziartia* and one species of *Pectocythere* in Lake Macquarie, New South Wales, is investigated and three new species: *Mckenziartia thomi* sp. nov., *Mckenziartia mowbrayi* sp. nov. and *Pectocythere royi* sp. nov., are described.

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## INTRODUCTION

The genus *Mckenziartia* was described by Bentley (1988) on the basis of carapace morphology. The genus was erected to designate a group of pectocytherid ostracodes characterized by the presence of a crescentic fossa over the central muscle field, a large anterior vestibulum with short, simple or occasionally-branched marginal pore canals, and an antimerodont hinge structure. The crescentic fossa over the central muscle field was described as a diagnostic feature of the genus. Examination of a large population of the species from different estuaries of New South Wales shows, however, that the size and shape of fossa may vary and is often integrated with the ornamentation pattern of the valves. The size and the shape of the vestibulum and the distribution of the anterior marginal pore canals remain unchanged, and they present a more stable diagnostic feature for the genus.

*Mckenziartia* Bentley is a typical inhabitant of the estuarine environment and has been reported from several estuaries around Australia (Bentley, 1988).

Present work investigated the distribution pattern of four species of *Mckenziartia*: *Mckenziartia portjacksonensis* (McKenzie, 1967), *Mckenziartia foveata* (Hartmann, 1978), *Mckenziartia thomi* sp. nov. and *Mckenziartia mowbrayi* sp. nov., as well as distribution of *Pectocythere royi* sp. nov., another member of the Pectocytheridae in Lake Macquarie. The type specimens are deposited at the Australian Museum. Some paratype specimens were also deposited at the Commonwealth Palaeontological collection in the Bureau of Mineral Resources, Canberra.

## AREA STUDIED

Lake Macquarie is located some 85km north of Sydney, on the central coast of New South Wales. With an extremely irregular outline, the lake extends in a north-south direction for over 22km, has a width of 10km and a surface area of 110km<sup>2</sup>.

The average depth of the lake is 6.7m and its maximum depth never exceeds 12m. A narrow inlet channel 3.5km in length and 240m to 400m wide connects the lake to the Pacific Ocean.

The lake has a total catchment area of 770km<sup>2</sup>. Three major creeks; Mannering Creek in the south, Dora Creek in the west and Cockle Creek in the north, contribute up to 4% of the total lake volume (Bass Becking *et al.*, 1959). Some seven other minor creeks

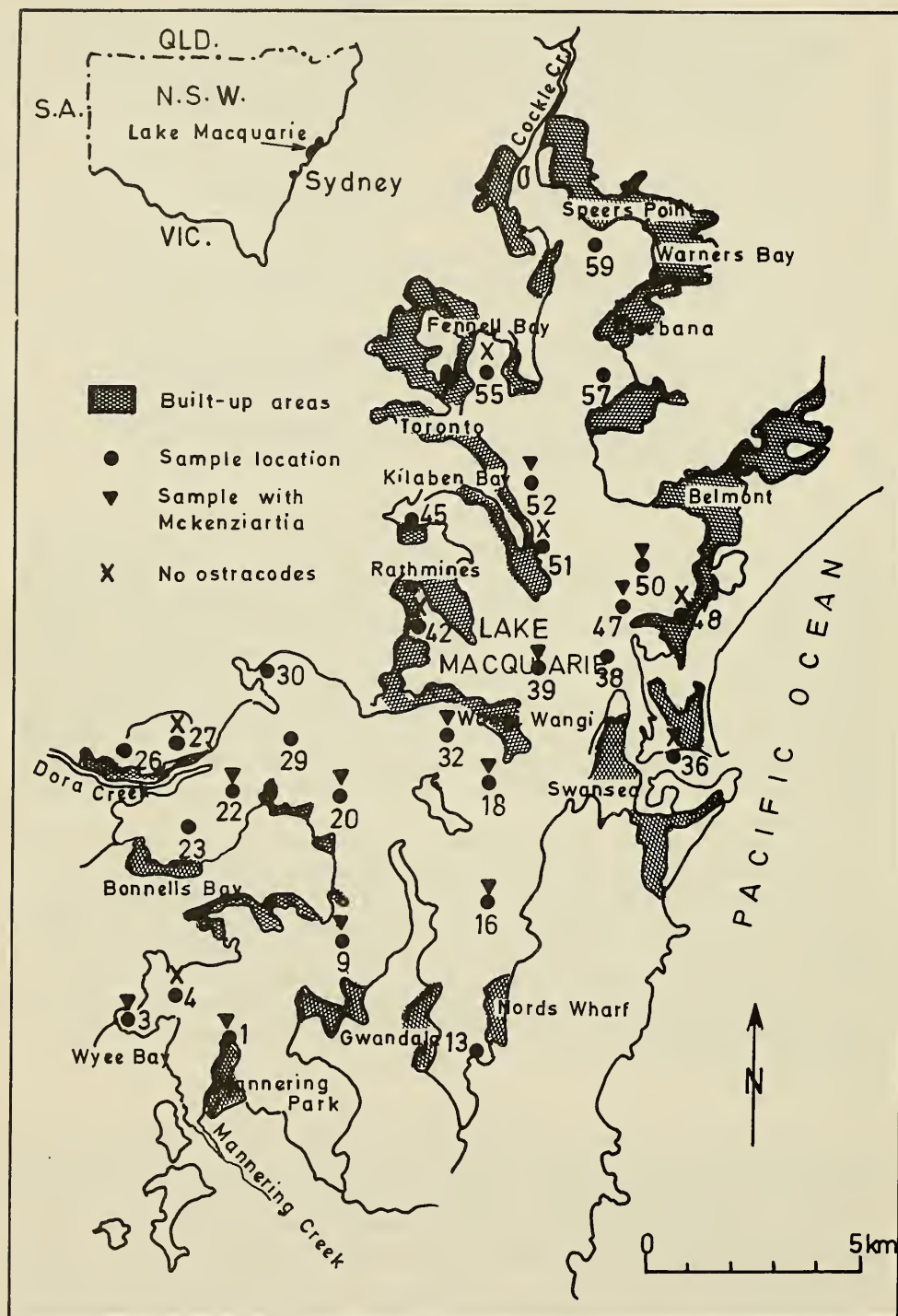


Fig. 1. Location map of the samples studied.

TABLE 1  
Species and number of valves in 30ml of samples

Species	Samples											
	52	50	47	39	32	22	20	18	16	9	3	1
<i>Mckenziartia portjacksonensis</i> . . . . .	26	10	245	74	24	8	18	40	23	14	3	2
<i>Mckenziartia thomi</i> . . . . .	—	—	48	—	—	—	—	—	—	—	—	—
<i>Mckenziartia foveata</i> . . . . .	—	—	12	—	—	—	—	—	—	—	—	—
<i>Mckenziartia mowbrayi</i> . . . . .	—	—	—	2	—	—	—	—	—	—	—	8
<i>Pectocythere royi</i> . . . . .	—	—	22	—	—	—	—	—	—	—	—	—

also flow into the lake during the rainy periods. A total of 26 grab samples were taken from the bottom sediment of the lake; Fig. 1 indicates the location of the samples studied. Table 1 shows the number of valves of each species in 30ml of unwashed sample.

#### SYSTEMATICS

Class OSTRACODA Latreille, 1802

Order PODOCOPIIDA Müller, 1894

Family PECTOCYOTHERIDAE Hanai, 1957

Genus *Mckenziartia* Bentley, 1988

MCKENZIARTIA PORTJACKSONENSIS (McKenzie, 1967)

Fig. 2A-D and Fig. 4A

'*Hemicytheridea*' *portjacksonensis* McKenzie, 1967: p. 85, pl. 12, figs 3i-j, 6.

*Munseyella* 'tumida' Swanson, 1979: p. 158, fig. 4q.

*Pectocythere portjacksonensis* (McKenzie), Hartmann, 1980: p. 122, pl. 5 fig. 17.

*Pectocythere portjacksonensis* (McKenzie), Yassini and Jones, 1987: p. 826, pl. 2, fig. 21.

*Pectocythere portjacksonensis* (McKenzie), Bentley, 1988: p. 445, pl. 1, figs. e-f, text fig. 4a-b.

**Distribution:** The species has been recorded from many estuaries and shallow open marine environments around Australia (McKenzie, 1967; Hartmann, 1978, 1980; Yassini and Jones, 1987; Bentley, 1988) and from New Zealand (Swanson, 1979). In Lake Macquarie, it was recorded from 12 stations but it was particularly abundant at station 47 at the mouth of the inlet channel (Table 1).

*Mckenziartia foveata* (Hartmann, 1978)

Fig. 2G-I, Fig. 3G and Fig. 4B

*Pectocythere foveata* Hartmann, 1978: p. 144, pl. 14, figs. 12-13.

*Pectocythere foveata* Hartmann, Yassini and Jones, 1987: p. 826, pl. 2, figs. 18-20.

**Remarks:** The hinge structure and vestibulum pattern justify attribution to the genus *Mckenziartia*.

**Distribution:** The species has been recorded from several estuaries and shallow open marine environments around the continent (Hartmann, 1978; Yassini and Jones, 1987). In Lake Macquarie it was only found in sample 47, dredged from a seagrass bed close to the inlet channel (Table 1).

*Mckenziartia thomi* sp. nov.

Fig. 3A-F and Fig. 4C

**Diagnosis:** Carapace elongate, length about 2.6 times height. Anterior broadly rounded, posterior rounded ventrally, subvertical medio-dorsally. Dorsum straight,

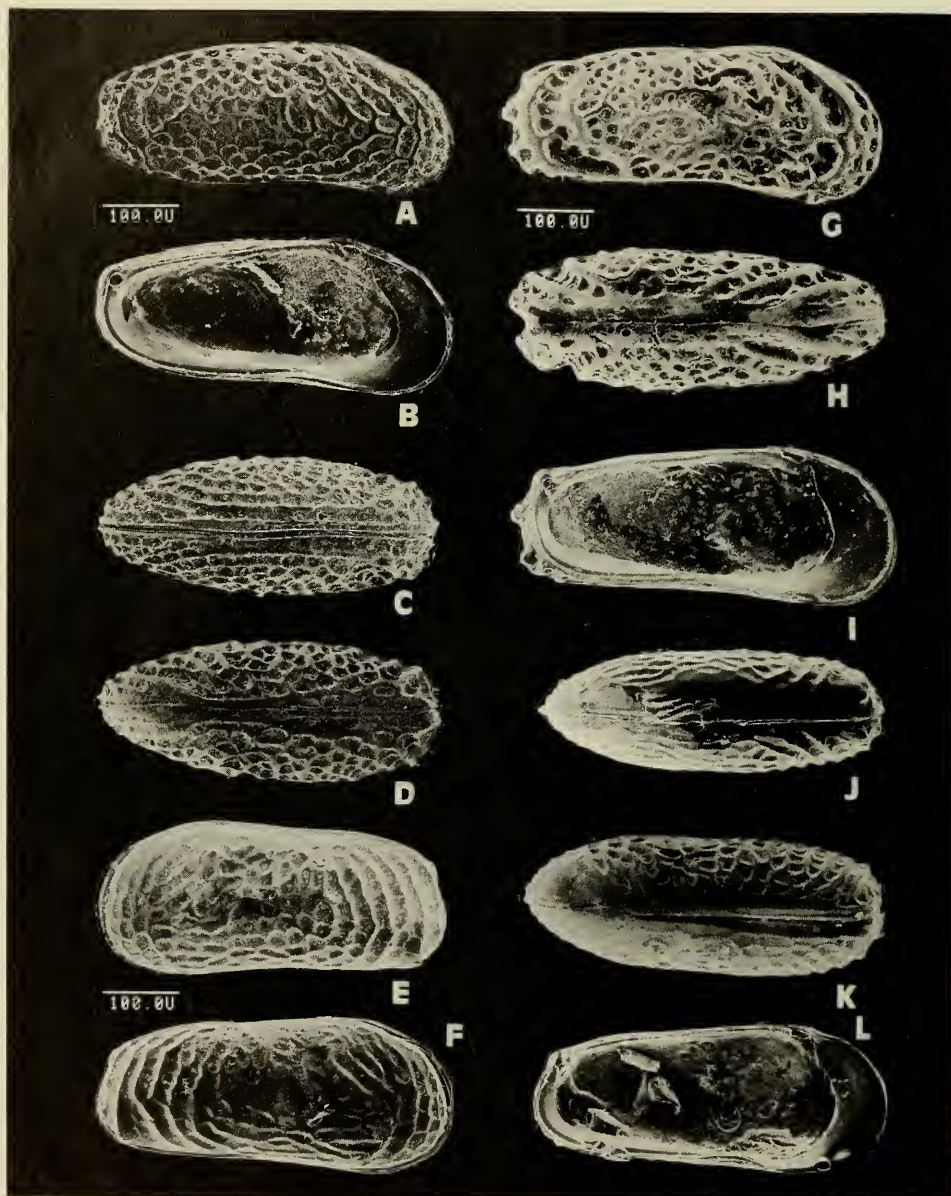


Fig. 2. A-D, *Mckenziartia portjacksonensis* (McKenzie): A, RV, ♂, external view; B, ♂, LV, internal view; C, ♀, ventral view of the carapace; D, ♂, dorsal view of the carapace, sample 47. E, F, J-L, *Mckenziartia mowbrayi* sp. nov.; E, LV, ♀, external view, holotype AM P37639; F, RV, ♂, external view, paratype AM P37641; J, ♀, ventral view of the carapace, paratype AM P37641; K, ♀, dorsal view of the carapace, paratype AM P37642; L, LV, ♂, internal view, paratype AM P37642, sample 1. G-I, *Mckenziartia foveata* (Hartmann): G, RV, ♂, external view; H, ♂, dorsal view of the carapace; I, LV, ♂, internal view, sample 47.

ventrum gently concave. Valves equal in size. In dorsal and ventral views, carapace elongate with parallel borders. Internally: inner lamella broad, anterior vestibulum deep, narrow, posterior vestibulum broad and elongate. Marginal pore canals simple, few and

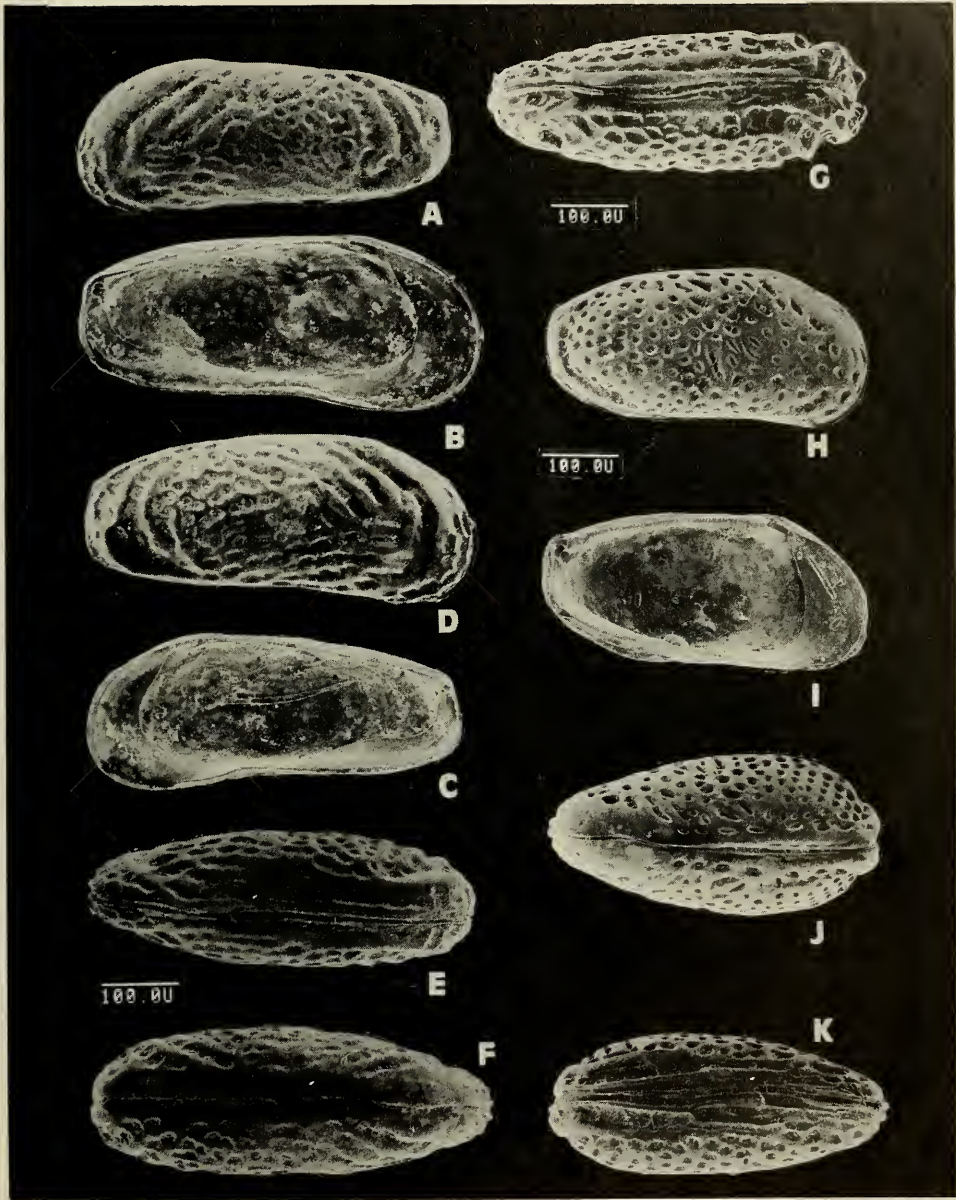


Fig. 3. A-F, *Mckenziartia thomi* sp. nov.; A, LV, ♂, external view paratype AM P37647; B, LV, ♀, internal view, paratype AM P37648; D, RV, ♀, external view, holotype AM P37646; C, RV, ♂, internal view, paratype AM P37649; E, ♂, ventral view of the carapace, paratype AM P37650; F, ♂, dorsal view of the carapace, paratype CPC 26554, sample 47. G, *Mckenziartia foveata* (Hartmann) ♂, ventral view of the carapace, sample 47. H-K, *Pectocythere royi* sp. nov.; H, RV, internal view, holotype AM P37661; I, LV, internal view, paratype AM P37662; J, dorsal view of the carapace, paratype AM P37663; K, ventral view of the carapace, paratype AM P37664, sample 47.

scattered. Hinge antimerodont. Muscle scars: four adductor scars in a subvertical row, two frontal scars and a large furcal scar. Valve surface reticulated, with three distinct

concentric ridges parallel to posterior margin and a set of oblique ridges joining the ventral ridge.

**Remarks:** With a crenulate posterior socket, and a straight and crenulate median bar the species clearly belongs to the Pectocytheridae and it can be differentiated from the allied species (*Mckenziartia portjacksonensis* (McKenzie) and *Mckenziartia mowbrayi* sp. nov.) in the details of surface ornamentation.

**Material:** Holotype AM P37646, right valve, adult male; length 0.51mm. Paratypes AM P37647, AM P37648, AM P37649, AM P37650 and CPC 26554. All from type locality.

**Type locality:** Lake Macquarie entrance tidal channel, New South Wales, Australia (lat. 33°03'00"S; long. 151°38'00"E); Recent, estuarine, muddy sand, with *Zostera capricorni* (Aschers.); depth 5.2m; on the sampling day salinity was 35.8‰, water temperature 22.8°C, and dissolved oxygen 6.6mg/l.

**Etymology:** The species is named after Professor Bruce Thom, Geography Department, University of Sydney.

**Distribution:** The species has also been recorded from Heron Island, off Queensland (Labutis, 1977) and Broken Bay, New South Wales (Yassini, unpublished).

*Mckenziartia mowbrayi* sp. nov.

Fig. 2E-F, J-L and Fig. 4D

**Diagnosis:** carapace elongate, length about 2.3 times height. Anterior broadly rounded, posterior rounded to gently subacute. Dorsum straight, ventrum gently concave in the middle. Valves equal in size. In dorsal and ventral views, sides of the carapace are parallel. Internally: inner lamella broad, anterior vestibulum shallow and broad. Posterior vestibulum narrow. Marginal pore canals straight, well-spaced and few. Hinge antimerodont. Valve surface reticulate, with a few distinct, concentric low ridges at the posterior end, and three at the anterior end. In ventral view, the ridges form a series of chevron-type grooves converged toward anterior and posterior ends. Muscle scars are typical of the genus *Mckenziartia* (Bentley, 1988).

**Remarks:** When compared with *Mckenziartia thomi* sp. nov. and *Mckenziartia portjacksonensis* (McKenzie), it differs in its typical surface reticulation.

**Material:** Holotype AM P37639, carapace, male; length 0.46mm. Paratypes AM P37640, AM P37641, AM P37642, AM P37643 and CPC 26553. All from type locality.

**Type locality:** Lake Macquarie (Sample 1), north of Mannering Park, New South Wales, (lat. 33°09'00"S; long. 151°33'00"E); Recent estuarine, sandy mud; depth 3.7m; on the sampling day salinity was 36.22‰, water temperature 22.8°C, and dissolved oxygen 4.4mg/l.

**Etymology:** After Mr William Mowbray, Chairman of Lake Illawarra Management Committee.

**Distribution:** Outside Lake Macquarie, the species has also been found in Broken Bay (Yassini, unpublished) and off Queensland (Labutis, 1977).

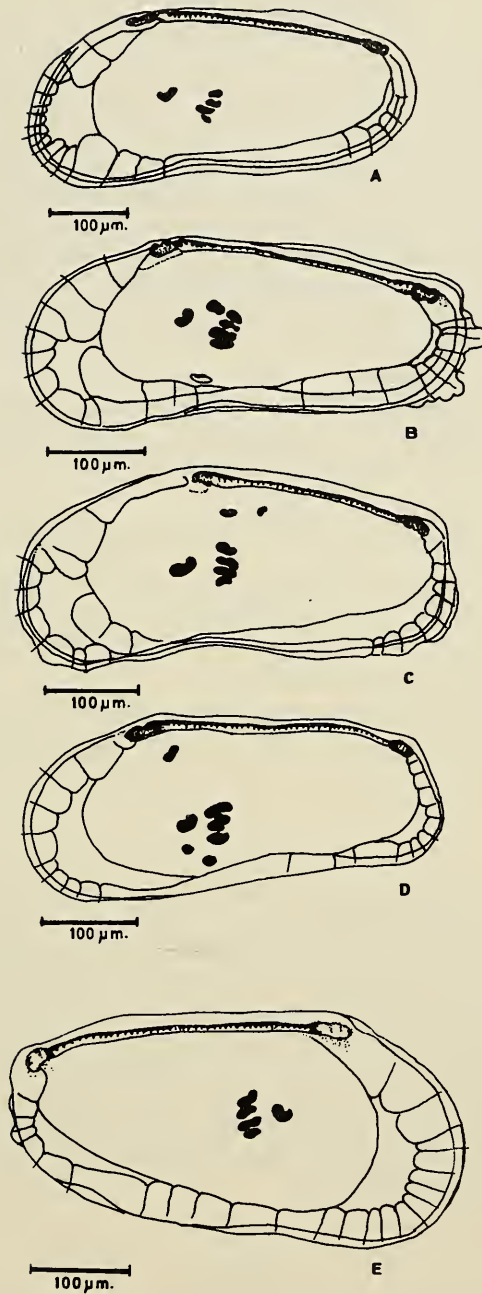


Fig. 4. A, *Mckenziartia portjacksonensis* (McKenzie), RV, internal structure; B, *Mckenziartia foveata* (Hartmann), RV, internal structure; C, *Mckenziartia thomi* sp. nov., RV, internal structure, holotype AM P37546; D, *Mckenziartia mowbrayi* sp. nov., RV, internal structure, paratype AM P37644; E, *Pectocythere royi* sp. nov., IX, internal structure, paratype AM P37638.

Genus *Pectocythere* Hanai, 1957*Pectocythere royi* sp. nov.

Fig. 3H-K and Fig. 4E

*Pectocythere* sp. (Ceduna 120), Hartmann; (*Nec* Hartmann, 1980) Yassini and Jones, 1987; p. 826, pl. 2, fig. 14-17.

**Diagnosis:** Carapace elongate, small, length about 2.1 times height. Anterior broadly rounded, posterior with an elevated rim and postero-ventrally oblique. Dorsum straight, slightly inclined posteriorly. Ventrum straight, valves ornamented with irregularly distributed rounded or elongated alveoli. In dorsal view, broader posteriorly. Internally: inner lamella broad, anterior vestibulum broad and shallow, marginal pore canals few and straight. Hinge merodont, consisting in the right valve of an elongate anterior tooth, distinctly crenulated median groove and coarsely lobated posterior terminal tooth. Central muscle scars comprising a row of four adductors and a V-shaped antennal scar. Sex dimorphism is not known.

**Remarks:** The only described species with closely similar shape is *Pectocythere* sp. (Ceduna 120) Hartmann (1980) which is easily distinguished from the present species by the depression of the postero-ventral region and lack of the raised posterior rim.

**Material:** Holotype AM P37661, right valve: 0.43mm length. Paratype AM P37662, AM P37663, AM P37664 and CPC 26555. All from type locality.

**Type locality:** Lake Macquarie (Sample 47), entrance tidal channel, New South Wales (lat. 33°03'00"S, long. 151°38'00"E); Recent, estuarine, muddy sand with *Zostera capricorni* (Aschers.); depth 5.2m; on the sampling day, salinity was 35.8‰, temperature 22.8°C and dissolved oxygen 6.6mg/l.

**Etymology:** After Dr Peter Roy, Geological Survey, New South Wales.

**Distribution:** Widely distributed in estuarine environments along the coast of New South Wales.

## DISCUSSION

Among the five described species, *Mckenziartia portjacksonensis* is the only one which is widespread and abundant in all the estuarine environments along the eastern coast of Australia; from Heron Island in the north (Labutis, 1977) to Bass Strait in the south (Yassini and Blom, in preparation). *Pectocythere royi*, has also been found in limited numbers in Broken Bay, Twofold Bay and Bass Strait. *Mckenziartia foveata*, initially described by Hartmann (1978) from Port Hedland, Western Australia, was also found in several estuaries of New South Wales (Lake Illawarra, Botany Bay, Broken Bay, Brisbane Waters). The species was also reported by Labutis (1977) from the Great Barrier Reef, off Queensland. The other two species; *Mckenziartia thomi* sp. nov. and *Mckenziartia mowbrayi* sp. nov. appear to be limited to the northern (Labutis, 1977) and central coast of New South Wales.

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